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ENVIRONMENT CANADA'S PROGRAM
FOR
WATER QUALITY OBJECTIVES

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PROGRAMME D'ENVIRONNEMENT CANADA RELATIF AUX OBJECTIFS DE QUALITE DE L'EAU

1987-1-9

Le présent document donne un aperçu du programme d'Environnement Canada relatif aux objectifs de qualité de l'eau. Il a été préparé à l'intention des hauts fonctionnaires du Ministère et des personnes intéressées à connaître les grandes lignes de ce programme. On pourra trouver plus de détails sur celui-ci dans un rapport de la Direction de la qualité des eaux intitulé "The Water Quality Objectives Program".

Raison d'être du programme

Les objectifs de qualité de l'eau représentent un instrument de gestion qui permet d'éviter ou de résoudre des conflits au sujet de la qualité de l'eau. Ils ont d'abord été utilisés au Canada pour aider à solutionner certains problèmes de pollution de l'eau, notamment dans les Grands Lacs. Certaines provinces et certains organismes de gestion des ressources emploient de tels objectifs depuis de nombreuses années.

Aux endroits où il n'existe pas d'objectifs concernant la qualité de l'eau, les projets d'aménagement des ressources qui influent sur la qualité de l'eau peuvent susciter des conflits avec d'autres utilisateurs, plus particulièrement lorsque ceux-ci sont dans un autre pays ou une autre province. Le gouvernement fédéral a été appelé à un certain nombre d'occasions à résoudre de graves conflits surgis au cours de la construction d'un ouvrage dans un cours d'eau international.

Ces conflits ont convaincu le gouvernement que si des objectifs de qualité de l'eau avaient existé à l'étape de la planification des projets, il aurait été beaucoup plus facile d'éviter les conflits au sujet de la qualité de l'eau. En conséquence, Environnement Canada a mis sur pied un programme ayant pour but d'élaborer, en collaboration avec les autorités compétentes, de tels objectifs pour les nouveaux projets susceptibles d'altérer l'eau des cours d'eau canado-américains importants.

Nature des objectifs

Les objectifs de l'eau indiquent les conditions que les gestionnaires des eaux ont convenu de respecter en vue de protéger les utilisations reconnues de l'eau d'un lac, d'un cours d'eau ou d'un bassin versant particulier. (Voir aussi "Definitions".) Ils peuvent s'appliquer à toute une étendue d'eau ou encore à une zone ou à un emplacement particulier à l'intérieur de celle-ci.

Les objectifs de qualité de l'eau sont souvent exprimés sous forme de concentrations maximales tolérées dans l'eau pour des substances nocives particulières. Par exemple, l'Accord de 1978 relatif à la qualité de l'eau dans les Grands Lacs indique que

> la concentration totale de cadmium ... ne devrait pas dépasser 0,2 microgramme par litre, pour la protection de la vie aquatique.

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ENVIRONMENT CANADA'S WATER QUALITY OBJECTIVES PROGRAM

1987-1-9

This report outlines Environment Canada's Water Quality Objectives Program for senior managers of the Department and for others interested in an overview of the program. More details on the subject can be found in a Water Quality Branch report entitled "The Water Quality Objectives Program."

Why Environment Canada Has a Water Quality Objectives Program

Water quality objectives are used as a managment tool to avoid or resolve conflicts related to water quality. They were first used in Canada to help resolve specific water pollution problems, notably in the Great Lakes. Some provincial governments and resource management agencies have also used objectives for many years.

In the absence of water quality objectives, developments which affect water quality can cause conflicts with other users, particularly if the users are in another country or province. In the past the federal government has occasionally been called upon to resolve serious disputes which arose during construction of a project on an international waterway.

These disputes persuaded the government that if water quality objectives had been available when the project was being planned, it would have been much easier to avoid conflicts over water quality. Environment Canada therefore began a program whose goal was to develop water quality objectives, in advance of new water-related projects, on significant Canada-U.S. rivers in cooperation with the relevant jurisdictions.

What Water Quality Objectives Are

Water quality objectives describe the conditions that water managers have agreed to meet in order to protect the identified uses of water for a particular lake, river or drainage basin (see also Definition of Terms). They may apply to the entire water body or to a specific area or location in it.

Water quality objectives often take the form of maximum concentrations of harmful substances that will be tolerated in the water. For example, the 1978 Great Lakes Water Quality Agreement states that:

> The concentration of total cadmium ... should not exceed 0.2 microgram per liter to protect aquatic life.

Objectives may take other forms, including:

- minimum concentrations in water (e.g. dissolved oxygen)
- ranges of values (e.g. pH)
- descriptions of desired conditions (e.g. absence of floating debris)
- maximum concentration in fish (e.g. mercury, PCBs)
- maximum concentrations in sediment (e.g. for dredging)
- effects (e.g. no morphological defects in a designated fish species)
- other biological variables (e.g. chlorphyll density, bacteria)

Objectives for water, along with those for air and land, make up the environmental quality objectives which form a cornerstone of the Federal Environmental Quality Policy Framework. The importance of these objectives has led to to their inclusion in the proposed Environmental Protection Act.

Why Water Quality Objectives Are Used

Water quality objectives are used:

- to describe the conditions necessary to protect water uses
- to demonstrate the jurisdictions' commitments to environmental quality
- as a basis for pollution control regulations
- as a yardstick for assessing the health of a water body

In the special case of boundary waters, objectives also serve to:

- designate conditions to be maintained or attained at the boundary
- clarify international (or interprovincial) obligations
- allow managers to manage their portions of the basins independently, using objectives as a "boundary condition"

The Uses That Objectives Protect

We take water from rivers, lakes and wells and use it, with or without treatment, for:

- industrial processing
- municipal water supply
- watering livestock
- irrigating crops

Other organisms live in or near the water, so the water must be clean enough to protect:

- fish and other aquatic life
- wildlife

Many water bodies are admired for their scenic beauty and are used extensively for sport fishing, swimming and other water sports, so we may wish our water quality objectives to protect:

- contact recreation
- consumers of fish
- aesthetic qualities

How Water Quality Objectives Are Developed

The need to develop objectives often appears when a company announces a new project that could affect water quality in a basin. It may also occur with a decision to address an existing problem or to develop objectives for watershed protection. Those charged with developing objectives must decide what uses are to be protected, obtain the necessary information, formulate the objectives and present them for approval. Once they have accepted the objectives, governments will normally try to meet them by implementing a pollution control program.

Developing objectives is often complex and time-consuming, particularly when it comes to objectives for toxic substances to protect aquatic life. There are a large number of species in each aquatic ecosystem, and often a large number of toxic substances are produced by human activity in the basin. Developing objectives requires an extensive knowledge of the chemical, physical and biological properties of the waterway, as well as the social and economic characteristics of the basin. Some of the uses may conflict, resulting in a need for cost-benefit analysis and risk assessment. It often turns out that some of the information needed is not available, and a study of the basin has to be done.

A knowledge of how the substances affect the plants and animals found in the basin is also needed. To provide this type of information, the Canadian Council of Resource and Environment Ministers (CCREM), with support from Environment Canada, has published "Canadian Water Quality Guidelines." This publication contains basic information on the effects of many substances on the water uses listed above.

How Other Agencies Participate

The water managers who develop and implement objectives are often provincial government officials. In the case of the territories the work may be done by Indian and Northern Affairs in collaboration with the territorial government. If the basin in question extends across more than one province or territory, the governments may form a water management agency such as the Prairie Provinces Water Board (PPWB) to deal with objectives as well as other water issues. Environment Canada is a key participant in the case of the PPWB.

Federal departments are involved in basins that extend across the international border. Generally the technical work is done by Environment Canada in cooperation with its provincial and U.S. counterparts, while formal contacts with the U.S. authorities are made by External Affairs. The matter may also be referred to the International Joint Commission, which works in collaboration with these same agencies.

Other federal Departments such as National Health and Welfare, Agriculture, and Fisheries and Oceans may participate or be consulted in their fields of expertise. Views may be sought from the private sector, environmental groups and the general public.

How Objectives are Implemented

The same water managers who develop water quality objectives are often responsible for their implementation. Objectives that apply within a province are often implemented by provincial regulations. In the case of transboundary waters, objectives may be implemented by many mechanisms, ranging from a formal agreement such as the Great Lakes Water Quality Agreement, to an understanding among the officials who set regulations and plan pollution-control programs.

A plan for implementation of objectives should include provisions for surveillance, data interpretation, and recommendations for remedial actions. It is important to develop procedures to follow in the event objectives are exceeded. The agencies should also review the adequacy of the objectives from time to time.

How the Objectives Program Will Attain Its Goal

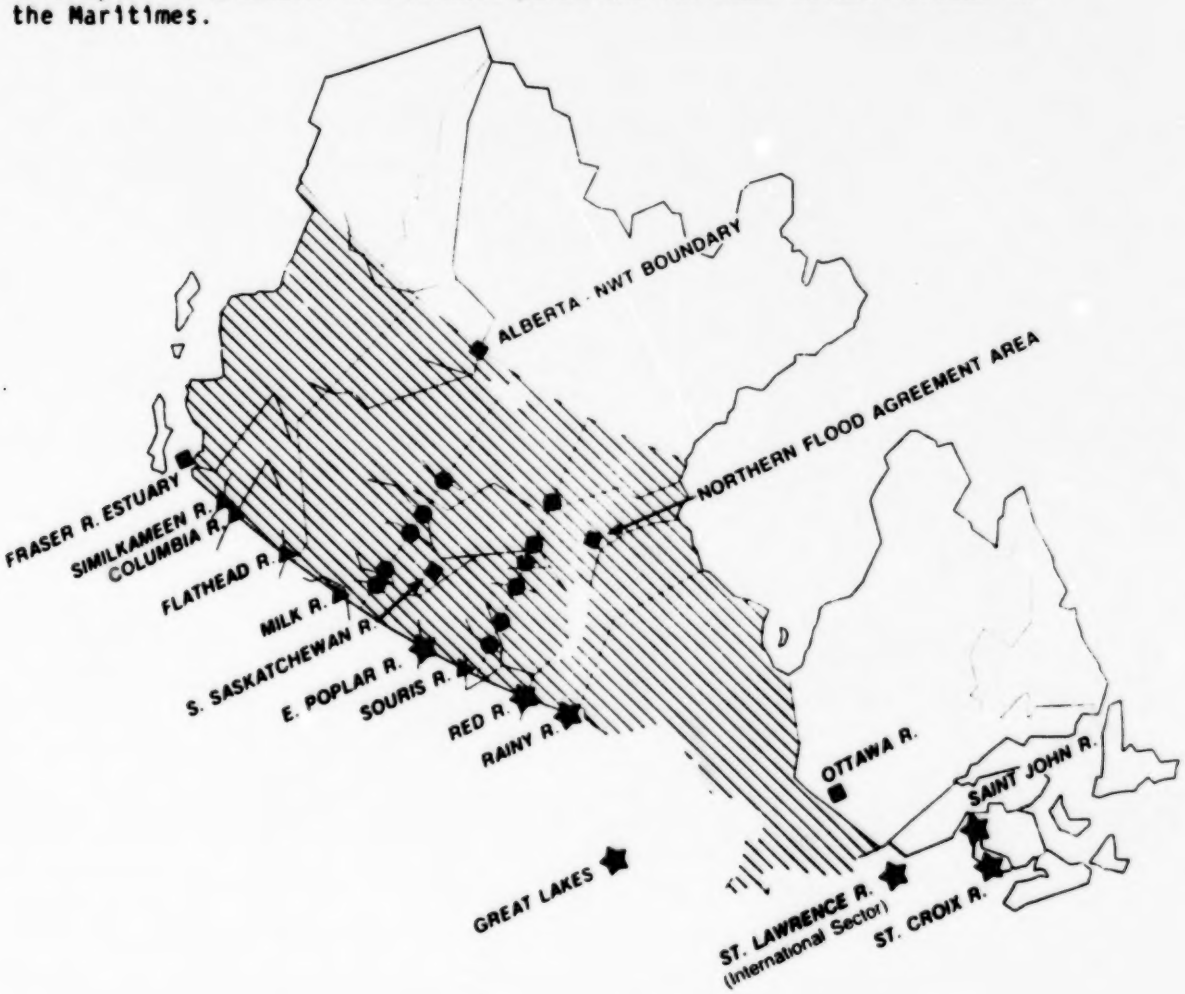
In order to carry out its program the Department must persuade other agencies to join it in developing water quality objectives during a period of restraint. The strategy adopted by the Department for this purpose includes:

- support for the preparation of Canadian Water Quality Guidelines, which should reduce the time consumed in information gathering and processing
- a vigorous promotional campaign to make other agencies aware of the advantages of water quality objectives
- provision of information and advice to other agencies developing objectives
- participation with other agencies in studies of high-priority basins to obtain site-specific information
- a policy of requiring cost-recovery from agencies requesting significant assistance in low-priority areas, conserving the Department's resources for its highest priorities (international and interprovincial waters).

Where Water Quality Objectives Are Used

This map shows most of the places where water quality objectives have been developed, or are being developed, in Canada. Some objectives apply to a very specific site, such as the East Poplar River at the international border. Others may apply to a basin, such as the Great Lakes Basin. Some apply to all the waters in a province except those for which site-specific objectives have been developed.

In addition to the locations shown, objectives have been or are being developed for a number of national parks and for some salmon streams in the Maritimes.



WATER QUALITY OBJECTIVES USED BY THE PROVINCIAL GOVERNMENT

★ INTERNATIONAL OBJECTIVES DEVELOPED (INTERNATIONAL JOINT COMMISSION EXCEPT THE SAINT JOHN R.)

▲ INTERNATIONAL OBJECTIVES BEING DEVELOPED OR PROPOSED

● SITE-SPECIFIC OBJECTIVES BEING DEVELOPED BY PRAIRIE PROVINCES WATER BOARD AT INTERPROVINCIAL BOUNDARIES

■ OTHER OBJECTIVES BEING DEVELOPED OR PROPOSED

DEFINITION OF TERMS

The terms criteria, guideline, objective and standard are used in different ways by different agencies. The Canadian Council of Resource and Environment Ministers adopted the following definitions.

- **Criteria**: scientific data evaluated to derive the recommended limits for water uses.
- **Water quality guideline**: numerical concentration or narrative statement recommended to support and maintain a designated water use.
- **Water quality objective**: a numerical concentration or narrative statement which has been established to support and protect the designated uses of water at a specified site.
- **Water quality standard**: an objective that is recognized in enforceable environmental control laws of a level of government.

<u>For Further Information</u>

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